UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/057,817	03/28/2003	Charles F. Marino	END920010104US1	4278

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HOFFMAN WARNICK & D'ALESSANDRO, LLC
75 STATE STREET
14TH FLOOR
ALBANY, NY   12207

EXAMINER
CHOW, JEFFREY J

ART UNIT	PAPER NUMBER
2628	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	10/057,817	MARINO, CHARLES F.
	Examiner	Art Unit	
	Jeffrey J. Chow	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *16 October 2006*.

2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1,3-8,10-13 and 15-18* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1,3-8,10-13 and 15-18* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on *16 October 2006* is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments regarding claims 1, 3 – 8, 10 – 13, and 15 – 18, filed 16 October

2006, have been fully considered but they are not persuasive.

Applicant argues Blomgren (US 5,935,198) does not teach bit slicing each multiplier

according to the pixel format (page 8). Bloomgren discloses taking a full-size multiplier, such

as a 32-bit multiplier, and dividing into smaller sections which can operate independently for 8-

bit multipliers (column 13, lines 28 – 37). Bloomgren discloses each pixel has three color

components: Red, Green, Blue, and a fourth componenent: alpha (column 13, lines 18 and 19)

and where interpolation must be performed on all three color components and often on the alpha

components (column 13, lines 19 – 21) and performing four interpolations in parallel

significantly improves throughput (column 13, lines 21 – 27) and therefore all four smaller pixel

components can be interpolated simultaneously in a larger multiplier (column 13, lines 35 – 37).

Applicant argues Blomgren does not disclose splitting a full-adder matrix for an 8-bit-by

8-bit multiplier by bit-slicing according to the pixel format (page 8). Though, Blomgren

discloses splitting a 32- or 64-bit multiplier based on pixel color components (column 13, lines

17 – 42), the principle of dividing a full-size multiplier based on pixel color components is

taught by Blomgren. However, Flahie discloses dividing an 8-bit x 8-bit multiplier into four 4-

bit by 4-bit multipliers. Christensen discloses multicolor pixel word is a 16-bit word including 4

sets of 4-bits, each set describing a color (claim 3).

Applicant argues Blomgren does not disclose reconfiguring each blending unit multiplier

to perform at least two operations per cycle, wherein the reconfiguring includes bit slicing each

multiplier according to the pixel format (page 9). Blomgren discloses all four smaller pixel

component can be interpolated simultaneously in a larger multiplier (column 13, lines 35 – 37).

Applicant argues the Office has not provided explanations or guidelines as to its rationale

on which a person of ordinary skill in the art may follow in modifying Blomgren by applying

Flahie and Christensen (page 10). Since Blomgren discloses dividing a full-size multipler into

smaller sections to perform parallel interpolations (column 13, lines 17 – 42), but did not

expressly disclose the specifics of this division process as disclosed in Flahie reference. Flahie

clearly discloses a 16-bit multiplier being divided into multiple 4-bit multipliers (Figure 2).

Christensen discloses multicolor pixel word is a 16-bit word including 4 sets of 4-bits, each set

describing a color (claim 3), which provides a 4444 RGBA pixel format. Since Christensen

provides an example of a 16-bit pixel with 4444 RGBA pixel format and Flahie provides a 16-bit

multiplier being divided into 16 multipliers, it would have been obvious to easily modify

Flahie's system to provide an 8-bit multiplier being divided into 4 multipliers or even keeping

Flahie's system having 16-bit multiplier and processing 4 16-bit pixels. With Blomgren

suggesting dividing a full-size multiplier, it would have been obvious for one of ordinary skill in

the art to modify Blomgren's system to divide the full-size multiplier as Flahie suggested and to

process a 16-bit pixel with 4444RGBA as Christensen suggest. One would be motivated to do so

because this provides parallel interpolation, which is faster than series interpolation.

Applicant argues Flahie does not teach at least two operations per cycle (pages 10 and

11). Blomgren discloses the full-size multiplier may be divided into smaller sections which can

operate independently for 8-bit multiplies, or together as one large multiplier for 32-bit

multiplies and all four smaller pixel components can be interpolated simultaneously in a larger

multiplier (column 13, lines 28 – 43), which reads on the claimed reconfiguring each blending

unit multiplier to perform at least two operations per multiplier per cycle.

Applicant argues that the Office has not explained the manner in which a person of

ordinary skill in the art would modify Blomgren's system to incorporate Allen's scaling engine

(page 11). Since Blomgren's interpolates pixel color components, this system can be used for a

video. From there, a scaler could be used on the interpolate pixels in the video for magnification

purpose or fit a resolution of a screen/window. However, the claim is broad enough in where a

scaler of Allen's system being combined with Blomgren's system would read on the claimed

limitations.

The specification and drawing objections have been withdrawn due to applicant's

amendments to the drawings.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3– 6, 8, 10 – 13, and 15 – 17 are rejected under 35 U.S.C. 102(b) as being

anticipated by Blomgren (US 5,935,198).

Regarding independent claim 1, Blomgren discloses a pixel format where each pixel have

4 8-bit components (R, G, B, A) (column 1, lines 44 – 60) and blending or interpolating two

objects together (column 5, line 60 – column 6, line 61), which reads on the claimed receiving a

request for blending the at least two images, each image having a pixel format. Blomgren

discloses the full-size multiplier may be divided into smaller sections which can operate

independently for 8-bit multiplies, or together as one large multiplier for 32-bit multiplies and all

four smaller pixel components can be interpolated simultaneously in a larger multiplier (column

13, lines 28 – 43), which reads on the claimed reconfiguring each blending unit multiplier to

perform at least two operations per cycle. Blomgren discloses the full-size multiplier may be

divided into smaller sections which can operate independently for 8-bit multiplies, or together as

one large multiplier for 32-bit multiplies and all four smaller pixel components can be

interpolated simultaneously in a larger multiplier (column 13, lines 28 – 43), which reads on the

claimed bit slicing each multiplier according to the pixel format.

Regarding dependent claim 3, Blomgren discloses the full-size multiplier may be divided

into smaller sections which can operate independently for 8-bit multiplies, or together as one

large multiplier for 32-bit multiplies and all four smaller pixel components can be interpolated

simultaneously in a larger multiplier (column 13, lines 28 – 43) and the operands

accommodating a plurality of bits, such as 8-bits or 16-bits (column 6, lines 53 – 56), which

reads on the claimed bit slicing each multiplier to accommodate a first bits/pixel parameter of the

pixel format.

Regarding dependent claim 4, Blomgren discloses the full-size multiplier may be divided

into smaller sections which can operate independently for 8-bit multiplies, or together as one

large multiplier for 32-bit multiplies and all four smaller pixel components can be interpolated

simultaneously in a larger multiplier (column 13, lines 28 – 43) and the operands

accommodating a plurality of bits, such as 8-bits or 16-bits (column 6, lines 53 – 56), which

reads on the claimed bit slicing each multiplier to accommodate a second bits/pixel parameter of the pixel format.

Regarding dependent claim 5, Blomgren discloses the full-size multiplier may be divided into smaller sections which can operate independently for 8-bit multiplies, or together as one large multiplier for 32-bit multiplies and all four smaller pixel components can be interpolated simultaneously in a larger multiplier (column 13, lines 28 – 43) and the operands accommodating a plurality of bits, such as 8-bits or 16-bits (column 6, lines 53 – 56) and where the first bit is the most significant bit, being the bit on the far left of the operands and the product (Figure 9), which reads on the claimed first bits/pixel parameter is a highest bits/pixel parameter of the pixel format.

Regarding dependent claim 6, Blomgren discloses the full-size multiplier may be divided into smaller sections which can operate independently for 8-bit multiplies, or together as one large multiplier for 32-bit multiplies and all four smaller pixel components can be interpolated simultaneously in a larger multiplier (column 13, lines 28 – 43), which reads on the claimed highest bits/pixel parameter is no higher than 8 bits/pixel and no les than 1 bit/pixel.

Regarding claims 8, 10, 13, and 15, claims 8, 10, 13, and 15 are similar in scope as to claims 1, 3, and 4, thus the rejections for claims 1, 3, and 4 hereinabove are applicable to claims 8, 10, 13, and 15. Blomgren discloses a processor unit and a memory graphics processor circuitry (claim 9).

Regarding dependent claim 11, Blomgren discloses the binary multipliers adapted for 3-D graphics calculations (column 1, lines 10 – 12), which reads on the claimed blending unit is part of a graphics engine.

Regarding dependent claim 16, claim 16 is similar in scope as to claim 11, thus the rejections for claim 11hereinabove is applicable to claim 16.

Regarding dependent claim 12, Blomgren discloses the interpolation instruction being used for a white fog effect (column 3, lines 19 – 53) and other color interpolation operation such as anti-aliasing, depth cueing, texture-map interpolation, alpha blending, fog, translucency, Phong shading and Gouraud shading (column 3, lines 58 – 65), which reads on the claimed graphics engine further comprises at least one of a raster operator, a color key operator, a pixel bit mask operator, a patter write mask operator and a pixel boundary modify write operator.

Regarding dependent claim 17, claim 17 is similar in scope as to claim 12, thus the rejections for claim 12 hereinabove is applicable to claim 17.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Blomgren (US 5,935,198) in view of Flahie et al. (US 5,912,832) and Christensen et al. (US 5,612,710).

Regarding dependent claim 7, Blomgren did not expressly disclose dividing an 8-bit x 8-bit multiplier to perform at least two operations per cycle. Flahie discloses dividing an 8-bit x 8-bit multiplier into four 4-bit by 4-bit multipliers. Christensen discloses multicolor pixel word is a 16-bit word including 4 sets of 4-bits, each set describing a color (claim 3). It would have been

obvious for one of ordinary skill in the art at the time of the invention to modify Blomgren's system by dividing an 8-bit x 8-bit multiplier into 4 sets of 4-bit x 4-bit multiplier to perform interpolation on a 16-bit word color value where each set represents a color or even to perform interpolation of any n-bit x n-bit multiplication operation in any size multiplier where n is greater than or equal to 1 and n is less than the size of the multiplier's dimensions. One would be motivated to do so because parallel interpolation significantly improves throughput and to be compatible to perform interpolation of any n-bit color format, such as a 4-bit color format.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Blomgren (US 5,935,198) in view of Allen et al. (US 5,838,387).

Regarding dependent claim 18, Blomgren did not expressly disclose a scalar in the graphics system. Allen discloses a video scaling engine for scaling video data (abstract). It would have been obvious for one of ordinary skill in the art at the time of the invention to modify Blomgren's system to include a scalar. One would be motivated to do so because scaling data to a desirable size can improve bandwidth in communication or change a level to the desired detail in rendering images.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey J. Chow whose telephone number is (571)272-8078. The examiner can normally be reached on Monday - Friday 10:00AM - 5:00PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on (571)-272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ULKA CHAUHAN
SUPERVISORY PATENT EXAMINER